

UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF CALIFORNIA
SAN JOSE DIVISION

NITRIDE SEMICONDUCTORS CO., LTD.,
Plaintiff,
v.
RAYVIO CORPORATION,
Defendant.

Case No. [5:17-cv-02952-EJD](#)

CLAIM CONSTRUCTION ORDER

Re: Dkt. No. 61

Plaintiff Nitride Semiconductors Co., Ltd. (“Nitride”) brings this suit against Defendant RayVio Corporation (“RayVio”) for infringement of U.S. Patent No. 6,861,270 (the “’270 patent”). Nitride currently asserts claims 1, 2, 5, 8, 9, and 12. Across these claims, the parties dispute the proper construction of eight terms. Upon consideration of the claims, specification, prosecution history, and other relevant evidence, and after hearing the arguments of the parties, the Court construes the contested language of the patents-in-suit as set forth below.

I. BACKGROUND

The ’270 patent generally relates to semiconductors used in light-emitting diodes (“LED”). In its simplest form, an LED consists of an “n-type” semiconductor (which has an excess of electrons) joined to a “p-type” semiconductor (which has vacancies or “holes” which could be filled by electrons). As electrons move from the n-type semiconductor to the p-type semiconductor, they recombine with “holes” and release energy in the form of light.

A semiconductor generally consists of a crystalline structure or “lattice” of atoms, each of which contains a nucleus surrounded by electrons. These electrons exist at different energy levels

or “energy bands.” Two energy bands in particular contribute to the conductivity of the semiconductor: a “valence band” of lower energy electrons that stay fixed to a particular atom; and a “conduction band” of higher energy electrons which move about the semiconductor. The difference between the energy level of the valence band and the conduction band is known as the “band gap.” The lower the “band gap,” the easier it is for electrons to move and the more conductive the semiconductor is. The size of the “band gap” varies based on which elements (e.g., Ga, Al, Si) are used to form the semiconductor.

The ’270 patent relates to LEDs that are made using gallium nitride (“GaN”) based semiconductors. ’270 patent, col. 1 ll. 15-18. These LEDs are created using a sapphire substrate, upon which layers of n-type and p-type GaN semiconductors are added. *Id.*, col. 1 ll. 18-20. However, because the spacing of the atoms in the sapphire substrate differs from the spacing of the atoms in the GaN semiconductor, a “lattice mismatch” occurs between the two layers. *See id.* This causes “dislocations” within the GaN semiconductor layer. *Id.*, col. 1 ll. 19-20. When an electron recombines with a “hole” at a “dislocation,” it does not produce a visible photon, which reduces the efficiency of the LED. *Id.*, col. 1 ll. 22-25.

The ’270 patent addresses this problem by providing a “method for manufacturing a gallium nitride [GaN] compound semiconductor” which provides “improved light emitting efficiency.” *Id.*, col. 1 ll. 9-12. The ’270 patent improves efficiency by introducing “spatial fluctuation in the band gap” at the point where the electrons and holes recombine. *Id.*, col. 1 ll. 55-58. In the physical LED, the “spatial fluctuation” is created by varying the materials which are used at those locations (since, as discussed above, the size of the “band gap” varies based for different atomic elements). *Id.*, col. 1 ll. 27-38. According to the patent, if this variation can be tuned such that “the density of the light emitting points [where the electrons and holes recombine] can be set to exceed the density of the dislocations . . . degradation in the light emitting efficiency can be inhibited.” *Id.*, col. 1 ll. 31-39.

The ’270 patent discloses and claims three different methods of introducing “spatial fluctuation in the band gap.” The asserted claims cover two of these three:

The first method involves forming: (1) a first GaN based semiconductor on a substrate, (2) composition material of the first GaN based semiconductor on areas of the surface of the first GaN based semiconductor, and (3) a second GaN based semiconductor on the first GaN based semiconductor onto which the composition material is formed. Figures 1A-1B illustrate this process:

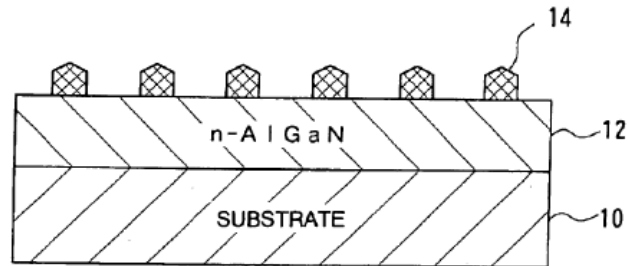


Fig. 1A

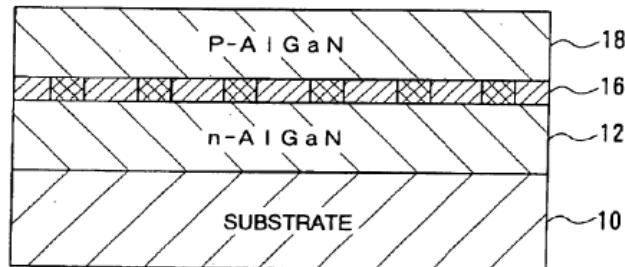


FIG. 1B

'270 patent, Figs. 1A, 1B.

Asserted claims 1, 2, 8, and 9 relate to this first method. For example, claim 1 recites:

1. A method for manufacturing a gallium nitride based semiconductor, comprising the steps of:
 - (a) forming a first gallium nitride based semiconductor on a substrate, the first gallium nitride based semiconductor having a first surface;
 - (b) forming on less than a total area of the first surface a composition material of the first gallium nitride based semiconductor; and

(c) forming a second gallium nitride based semiconductor on the first gallium nitride based semiconductor on which the composition material is formed; wherein a spatial fluctuation is created in the band gap by variation in the compositional ratio in the second gallium nitride based semiconductor created by the composition material, and the second gallium nitride based semiconductor is a light emitting layer.

Id., col. 5 ll. 29-44.

The other method (disclosed as the third embodiment in the specification) involves forming regions where "lattice mismatch is present" which are used to produce "a spatial fluctuation" in the band gap. '270 patent, col. 2 ll. 33-47. Figure 3 illustrates this process:

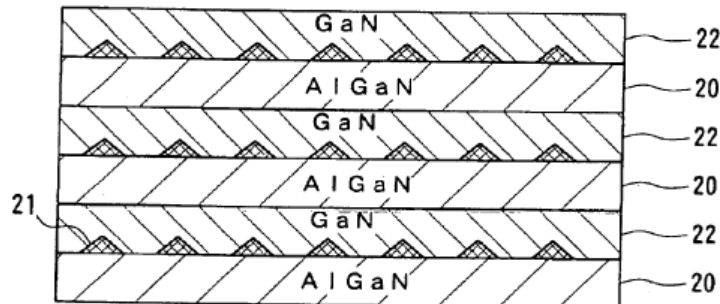


Fig. 3

Id., Fig. 3.

Asserted claims 5 and 12 relate to this other method. For example, claim 5 recites:

5. A method for manufacturing a gallium nitride based semiconductor comprising the steps of:
 - (a) forming, on a substrate, a base layer having a lattice mismatch layer formed on less than a total area of a surface of the base layer; and
 - (b) forming the gallium nitride based semiconductor on the base layer; wherein
 - a spatial fluctuation is created in the band gap of the gallium nitride based semiconductor by the lattice mismatch, and the gallium nitride based semiconductor is a light emitting layer.

Id., col. 6 ll. 1-12.

II. LEGAL STANDARDS

A. Claim Construction

Claim construction is a question of law to be decided by the court. *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 979 (Fed. Cir. 1995) (en banc), aff'd 517 U.S. 370, 116 S. Ct. 1384, 134 L.Ed.2d 577 (1996). “[T]he interpretation to be given a term can only be determined and confirmed with a full understanding of what the inventors actually invented and intended to envelop with the claim.” *Phillips v. AWH Corp.*, 415 F.3d 1303, 1316 (Fed. Cir. 2005) (quoting *Renishaw PLC v. Marposs Societa’ per Azioni*, 158 F.3d 1243, 1250 (Fed. Cir. 1998)). Consequently, courts construe claims in the manner that “most naturally aligns with the patent’s description of the invention.” *Id.*

In construing disputed terms, the court looks first to the claims themselves, for “[i]t is a ‘bedrock principle’ of patent law that ‘the claims of a patent define the invention to which the patentee is entitled the right to exclude.’” *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) (en banc) (internal quotation marks omitted). Generally, the words of a claim should be given their “ordinary and customary meaning,” which is “the meaning that the term[s] would have to a person of ordinary skill in the art in question at the time of the invention.” *Id.* at 1312-13. In some instances, the ordinary meaning to a person of skill in the art is clear, and claim construction may involve “little more than the application of the widely accepted meaning of commonly understood words.” *Id.* at 1314.

In many cases, however, the meaning of a term to a person skilled in the art will not be readily apparent, and the court must look to other sources to determine the term’s meaning. *Id.* Under these circumstances, the court should consider the context in which the term is used in an asserted claim or in related claims, bearing in mind that “the person of ordinary skill in the art is deemed to read the claim term not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the specification.” *Id.* at 1313. Indeed, the specification is “‘always highly relevant’ “ and “[u]sually dispositive; it is the single best guide to the meaning of a disputed term.” *Id.* at 1315 (quoting *Vitronics Corp. v.*

Conceptronic, Inc., 90 F.3d 1576, 1582 (Fed. Cir. 1996)).

The court may also consider the patent’s prosecution history, which consists of the complete record of proceedings before the United States Patent and Trademark Office and includes the cited prior art references. The court may consider prosecution history where it is in evidence, for the prosecution history “can often inform the meaning of the claim language by demonstrating how the inventor understood the invention and whether the inventor limited the invention in the course of prosecution, making the claim scope narrower than it otherwise would be.” *Id.* at 1317 (internal citations omitted).

Finally, the court is also authorized to consider extrinsic evidence in construing claims, such as “expert and inventor testimony, dictionaries, and learned treatises.” *Markman*, 52 F.3d at 980 (internal citations omitted). Although the court may consider evidence extrinsic to the patent and prosecution history, such evidence is considered “less significant than the intrinsic record” and “less reliable than the patent and its prosecution history in determining how to read claim terms.” *Id.* at 1317-18 (internal quotation marks and citation omitted). Thus, while extrinsic evidence may be useful in claim construction, ultimately “it is unlikely to result in a reliable interpretation of patent claim scope unless considered in the context of the intrinsic evidence.” *Id.* at 1319.

B. Indefiniteness

Section 112 requires that “[t]he specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention.” 35 U.S.C. § 112, ¶ 2.¹ In *Nautilus, Inc. v. Biosig Instruments, Inc.*, the Supreme Court established the operative test: “a patent is invalid for indefiniteness if its claims, read in light of the specification delineating the patent, and the prosecution history, fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention.” — U.S. —, 134 S. Ct. 2120, 2128-29, 189 L. Ed. 2d 37 (2014). The Federal Circuit has cautioned

¹ The America Invents Act (“AIA”), Pub. L. No. 112–29, effective September 16, 2012, changed the designation of 35 U.S.C. 112, ¶ 2 to 35 U.S.C. § 112(b). Because the asserted patent was filed before the effective date of the AIA, the Court refers to the pre-AIA versions of this provision. Case No.: [5:17-cv-02952-EJD](#)

that “the dispositive question in an indefiniteness inquiry is whether the ‘claims,’ not particular claim terms” fail this test. *Cox Commc’ns, Inc. v. Sprint Commc’n Co. LP*, 838 F.3d 1224, 1231 (Fed. Cir. 2016). For that reason, a claim term that “does not discernably alter the scope of the claims” may fail to serve as a source of indefiniteness. *Id.*

III. CONSTRUCTION OF DISPUTED TERMS

A. The Order of Steps in Method Claims 1 and 5

Nitride’s Proposed Construction	RayVio’s Proposed Construction	Court’s Construction
The claimed steps are not limited to a particular order.	Method claim 1 requires performance of the steps in the sequence recited in the claim, namely step (a) is performed, and then step (b) is performed, and then step (c) is performed. Method claim 5 requires performance of the steps in the sequence recited in the claim, namely step (a) is performed, and then step (b) is performed.	Method claim 1 requires performance of the steps in the sequence recited in the claim, namely step (a) is performed, and then step (b) is performed, and then step (c) is performed. Method claim 5 requires performance of the steps in the sequence recited in the claim, namely step (a) is performed, and then step (b) is performed.

The parties dispute whether the steps of the asserted method claims must be performed in the order recited in the claim. RayVio argues that the steps must be performed in the claimed order, while Nitride disagrees.

“[A]s a general rule [a method] claim is not limited to performance of the steps in the order recited, unless the claim explicitly or implicitly requires a specific order.” *Baldwin Graphic Sys., Inc. v. Siebert, Inc.*, 512 F.3d 1338, 1345 (Fed. Cir. 2008). “However, a claim ‘requires an ordering of steps when the claim language, as a matter of logic or grammar, requires that the steps be performed in the order written, or the specification directly or implicitly requires’ an order of steps.” *Mformation Techs., Inc. v. Research in Motion Ltd.*, 764 F.3d 1392, 1398 (Fed. Cir. 2014) (quoting *TALtech Ltd. v. Esquel Apparel, Inc.*, 279 Fed. Appx. 974, 978 (Fed. Cir. 2008)).

Here, the Court agrees with RayVio that the claimed steps must be performed in the recited order. Both claims 1 and 5 recite “a method of manufacturing a gallium nitride based semiconductor” which involves the incremental process of adding one specific layer on top of another. See ’270 patent, col. 5 ll. 29-44, col. 6 ll. 1-11. Varying the order in which the layers are

Case No.: [5:17-cv-02952-EJD](#)
CLAIM CONSTRUCTION ORDER

added yields a physically different device. “As a matter of logic,” order matters. *Mformation*, 764 F.3d at 1398.

As to which order should be required in this case, the plain language of the claims makes clear that the steps should be performed in the order they were written. For example, in claim 1, step (a), which forms the “first gallium nitride based semiconductor having a *first surface*,” must necessarily occur before step (b), which requires “*forming on* less than a total area of *the first surface* a composition material.” ’270 patent, col. 5 ll. 29-44 (emphasis added). Similarly, step (c), which requires “forming a second gallium nitride based semiconductor *on the first gallium nitride based semiconductor on which the composition material is formed*” must be performed after step (a), which creates the “first gallium nitride based semiconductor,” and step (b), which forms the “composition material.” *Id.* (emphasis added). The specification confirms that this is the correct order, as it also describes performing steps (a), (b), and (c) in that order. *See id.*, col. 3 ll. 34-44.

The same can be said of claim 5. Specifically, step (a), which requires “forming, on a substrate, a *base layer*,” must necessarily occur before step (b), which requires “forming the gallium nitride based semiconductor *on the base layer*.” *Id.*, col. 6 ll. 1-12 (emphasis added). Written the other way, there would be no “base layer” upon which the “gallium nitride based semiconductor” could be formed. The specification confirms this is the correct order, as it also describes performing step (a) before step (b). *See id.*, col. 4 ll. 54-59.

Accordingly, as a matter of logic, the steps of the asserted method claims must be performed in the order recited in the claim. The Court adopts RayVio’s position.

B. “forming on” / “formed on” (claims 1, 5, 8, 12)

Nitride’s Proposed Construction	RayVio’s Proposed Construction	Court’s Construction
“form(ing/ed) directly or indirectly above”	“form(ing/ed) in contact with and above”	“form(ing/ed) in contact with and above”

The parties dispute whether “forming on” permits forming structures “directly or indirectly above” (i.e., allows for intervening layers), as Nitride proposes, or is limited to forming structures

“in contact with and above” (i.e., excludes intervening layers), as RayVio proposes. The disputed phrases appear in each of the independent claims. For example, claim 1 recites:

1. A method for manufacturing a gallium nitride based semiconductor, comprising the steps of:
 - (a) *forming* a first gallium nitride based semiconductor *on* a substrate, the first gallium nitride based semiconductor having a first surface;
 - (b) *forming on* less than a total area of the first surface a composition material of the first gallium nitride based semiconductor; and
 - (c) *forming* a second gallium nitride based semiconductor *on* the first gallium nitride based semiconductor on which the composition material is formed; wherein a spatial fluctuation is created in the band gap by variation in the compositional ratio in the second gallium nitride based semiconductor created by the composition material, and the second gallium nitride based semiconductor is a light emitting layer.

’270 patent, col. 5 ll. 29-44 (emphasis added). As another example, claim 5 recites:

5. A method for manufacturing a gallium nitride based semiconductor comprising the steps of:
 - (a) *forming, on* a substrate, a base layer having a lattice mismatch layer formed on less than a total area of a surface of the base layer; and
 - (b) *forming* the gallium nitride based semiconductor *on* the base layer; wherein
 - a spatial fluctuation is created in the band gap of the gallium nitride based semiconductor by the lattice mismatch, and the gallium nitride based semiconductor is a light emitting layer.

Id., col. 6 ll. 1-12.

“Words of a claim are generally given their ordinary and customary meaning.” *Phillips*, 415 F.3d at 1312 (internal quotation marks and citation omitted). This is “the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention,” who, importantly, is “deemed to read the claim term not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the specification.” *Id.* at 1312, 1313. Ultimately, the “construction that stays true to the claim

language and most naturally aligns with the patent’s description of the invention will be, in the end, the correct construction.” *Trustees of Columbia Univ. in City of N.Y. v. Symantec Corp.*, 811 F.3d 1359, 1366 (Fed. Cir. 2016) (quoting *Renishaw PLC v. Marposs Societa’ per Azioni*, 158 F.3d 1243, 1250 (Fed. Cir. 1998)).

Applied here, these principles support RayVio’s position, not Nitride’s. The claims themselves are silent as to whether “form[ing/ed] on” permits intervening layers. However, read in light of the specification, it is clear that it does not. Nothing in the specification mentions intervening layers or suggests that the inventors contemplated that intervening layers could be introduced. *See* ’270 patent, col. 3 l. 28–col. 4 l. 7. Instead, the specification painstakingly describes the introduction of each of the claimed layers in detail, and in ways that suggest that each layer should be added directly on top of each other. For example, the specification discloses that “an n type $\text{Al}_y\text{Ga}_{1-y}\text{N}$ layer is grown on a substrate.” *Id.*, col. 3 ll. 34–35. It is hard to see how one layer could be *grown* on another, if some unnamed intervening layer could exist between the two. The same can be said of other claimed layers, which are described in a similar way in the specification. *Id.*, col. 3 ll. 41–42 (“undoped $\text{Al}_x\text{Ga}_{1-x}\text{N}$ layer 16 is grown”); *id.*, col. 3 ll. 54–56 (“After the undoped $\text{Al}_x\text{Ga}_{1-x}\text{N}$ layer 16 in which the spatial fluctuation is produced in the band gap is grown, a p type $\text{Al}_y\text{Ga}_{1-y}\text{N}$ layer 18 is grown at a temperature of 1050° C. to produce a double hetero structure.”). The figures also support this conclusion, as they only show the claimed layers. *See, e.g., id.*, Figs. 1A, 1B, 3. Nothing about the figures indicate that intervening layers could be added within the depicted layers.

In addition to these specific disclosures, the overall character of the invention also supports RayVio’s position. *See Praxair, Inc. v. ATMI, Inc.*, 543 F.3d 1306, 1324 (Fed. Cir. 2008) (construing claims so that they were “read in light of the specification’s consistent emphasis on [a] fundamental feature of the invention”); *Ormco Corp. v. Align Tech., Inc.*, 498 F.3d 1307, 1313–14 (Fed. Cir. 2007) (adopting construction which “most naturally aligns with the patent’s description of the invention”). As discussed in the background section above, the core of the invention is to increase light emitting efficiency by introducing “spatial fluctuation in the band gap.” This

“spatial fluctuation” is created by varying the composition of the materials in the LED—e.g., by, in the first embodiment, adding droplets of Ga to be mixed in with the undoped $\text{Al}_x\text{Ga}_{1-x}\text{N}$ layer. *Id.*, col. 3 ll. 38-55. Put simply, structure is important—it is the inventive crux of the claimed solution. The addition of unnamed intervening layers could change this structure and, as such, the very nature of the solution. As such, it does not make sense that “form[ing/ed] on” should be construed to permit such variation.

Nitride’s arguments to the contrary are unpersuasive. First, Nitride points to the patent’s disclosure that “AlGaN and AlGaN/GaN quantum well superlattices” “are formed on a sapphire substrate.” Opening Br. 7 (quoting ’270 patent, col. 1 ll. 15-21). However, although it is true that a superlattice can have multiple layers, this phrase simply refers to “superlattices” collectively and states that the collective whole is formed on a substrate. This is consistent with a meaning of “formed” which does not permit intervening layers. Moreover, this phrase appears in the “Background of the Invention” section and is used to make a general observation about the state of the art; nothing about its use there compels that “form[ing/ed] on” as used in the claims carries the same meaning. Second, Nitride refers to the examiner’s use of “form on” in discussing a prior art reference during prosecution. Opening Br. 7-8. However, this is extrinsic evidence which at most could illustrate “how one of skill in the art would understand the term.” *3M Innovative Props. Co. v. Tredegar Corp.*, 725 F.3d 1315, 1332 (Fed. Cir. 2013). As such, it does not justify a deviation from the intrinsic evidence, which supports RayVio’s position.

In sum, the Court adopts RayVio’s position and construes “form[ing/ed] on” as “form(ing/ed) in contact with and above.”

C. “a light emitting layer” (claims 1, 5, 8, 12)

Nitride’s Proposed Construction	RayVio’s Proposed Construction	Court’s Construction
“a thickness of material, which may be made up of sub-layers, that generates light”	“a thickness of material having unique electrical properties in which light is generated” During prosecution, the applicant made a disclaimer limiting “light emitting layer”	“a thickness of material having a varied compositional ratio, which may be made up of sub-layers, that generates light” During prosecution, the applicant made a disclaimer

	to having a varying compositional ratio within the light emitting layer and disclaimed compositional differences between layers, e.g., a super lattice layer comprising first and second layers which are nitride semiconductors having a different composition respectively.	limiting “light emitting layer” to having a varying compositional ratio within the light emitting layer.
--	---	--

The parties dispute whether “light emitting layer” may be composed of sub-layers, as Nitride proposes, or must be a single layer of material, as RayVio proposes. The disputed phrases appear in each of the independent claims. For example, claim 1 recites:

1. A method for manufacturing a gallium nitride based semiconductor, comprising the steps of:
 - (a) forming a first gallium nitride based semiconductor on a substrate, the first gallium nitride based semiconductor having a first surface;
 - (b) forming on less than a total area of the first surface a composition material of the first gallium nitride based semiconductor; and
 - (c) forming a second gallium nitride based semiconductor on the first gallium nitride based semiconductor on which the composition material is formed; wherein a spatial fluctuation is created in the band gap by variation in the compositional ratio in the second gallium nitride based semiconductor created by the composition material, and the second gallium nitride based semiconductor is a *light emitting layer*.

’270 patent, col. 5 ll. 29-44 (emphasis added). As another example, claim 5 recites:

5. A method for manufacturing a gallium nitride based semiconductor comprising the steps of:
 - (a) forming, on a substrate, a base layer having a lattice mismatch layer formed on less than a total area of a surface of the base layer; and
 - (b) forming the gallium nitride based semiconductor on the base layer; wherein
 - a spatial fluctuation is created in the band gap of the gallium nitride based semiconductor by the lattice mismatch, and the gallium nitride based semiconductor is a *light emitting layer*.

Id., col. 6 ll. 1-12.

The plain language of the claims resolves the parties' dispute. The final limitations of claims 5 and 12 recite a "gallium nitride based semiconductor" or "gallium nitride based semiconductor layer" which is a "light emitting layer." *Id.*, col. 6 ll. 1-12, 52-62. Dependent claims 7 and 13, then, recite that this "gallium nitride based semiconductor" or "gallium nitride based semiconductor layer" "has a superlattice structure." *Id.*, col. 6 ll. 15-17, 65-67. Thus, the "gallium nitride based semiconductor" or "gallium nitride based semiconductor layer" of claims 5 and 12 must at least be this broad—i.e., it must be one that could, but is not required to, have a superlattice structure. As both parties agree, a superlattice structure, by definition, has multiple layers. Opening Br. 9 ("a superlattice by definition is composed of multiple layers"); Responsive Br. 10 ("A superlattice by definition has multiple layers."). The specification also states as much. '270 patent, col. 4 ll. 51-53 ("These layers are formed in a similar manner in a repetition of n pitches (n can be set, for example, as 20) to obtain a superlattice structure."). Thus, the light-emitting layer may have multiple sub-layers.

That said, the claim language also makes clear that the light-emitting layer is not *required* to have sub-layers. For example, claims 1 and 8 recite a "second gallium nitride based semiconductor" which is a "light emitting layer." Claims 2 and 9 require that this "second gallium nitride based semiconductor" is AlGa_N—i.e., a single layer. Thus, a "light emitting layer" could also be a single layer.

Turning to prosecution history disclaimer, the Court agrees with RayVio in part. During prosecution, the applicant distinguished one of the asserted pieces of prior art, Nagahama, on the basis that it was "silent as to varying the compositional ratio within a light emitting layer" but rather only disclosed a "different composition is between the layers" in a "super lattice comprising first and second layers which are nitride semiconductors having a different composition respectively." Radke Decl., Ex. C (Nov. 4, 2003 Response), at 7-10. In other words, the applicant distinguished Nagahama because it did not disclose a varied compositional ratio *within* the superlattice, but rather simply disclosed a superlattice with uniform layers of alternating composition. Accordingly, RayVio is correct that the applicant "made a disclaimer limiting 'light

emitting layer’ to having a varying compositional ratio within the light emitting layer.” However, RayVio is not correct that the applicant also “disclaimed compositional differences between layers, e.g., a super lattice layer comprising first and second layers which are nitride semiconductors having a different composition respectively.” The dispositive difference during prosecution was that the applicant varied the compositional ratio of a layer within the “light emitting layer,” whereas Nagahama did not; whether and to what extent other layers (in the “light emitting layer” or outside it) varied in relation to one another did not matter. Thus, the Court finds that there was only prosecution history disclaimer to the extent that the applicant “made a disclaimer limiting ‘light emitting layer’ to having a varying compositional ratio within the light emitting layer.”

In sum, the Court agrees with Nitride that the “light emitting layer” is “a thickness of material, which may be made up of sub-layers, that generates light,” but also agrees with RayVio that “light emitting layer” must be such that it contains a variation within the compositional ratio. Thus, the Court adopts a hybrid of the two and construes “light emitting layer” to mean “a thickness of material having a varied compositional ratio, which may be made up of sub-layers, that generates light.”

D. “a spatial fluctuation is created in the band gap by variation in the compositional ratio in the second gallium nitride based semiconductor created by the composition material” (claim 1)

Nitride’s Proposed Construction	RayVio’s Proposed Construction	Court’s Construction
“continuous widening and narrowing of the band gap laterally within the second gallium nitride based semiconductor is created by changes in the ratio of the elements in the second gallium nitride based semiconductor created by the composition material”	This limitation is indefinite rendering claim 1 invalid. Alternative construction if claim is not indefinite: “a spatial fluctuation is created in the band gap by variation in the ratio of (1) the amount of composition material to (2) the amount of gallium nitride based semiconductor material, that is created by the composition material, i.e., material consisting of discrete area(s) of only a single element”	“continuous widening and narrowing of the band gap laterally within the second gallium nitride based semiconductor is created by changes in the ratio of the elements in the second gallium nitride based semiconductor created by the composition material” “Composition material is construed to mean “material composed of some, but not all, of the elements of the first

1		“composition material” means “material consisting of discrete area(s) of only a single element”	gallium nitride based semiconductor.”
2			
3			
4		During prosecution, the applicant made a disclaimer limiting “light emitting layer” to having a varying compositional ratio within the light emitting layer and disclaimed compositional differences between layers, e.g., a super lattice layer comprising first and second layers which are nitride semiconductors having a different composition respectively.	During prosecution, the applicant made a disclaimer limiting “light emitting layer” to having a varying compositional ratio within the light emitting layer.
5			
6			
7			
8			
9			
10			
11	“a second gallium nitride based semiconductor layer having changes in the ratio of the elements within it”	This limitation is indefinite rendering claim 8 invalid. Alternative construction if claim is not indefinite: “a second gallium nitride based semiconductor layer having a variation in the ratio of (1) the amount of composition material to (2) the amount of gallium nitride based material”	“a second gallium nitride based semiconductor layer having changes in the ratio of the elements within it”
12			
13			
14			
15			
16		During prosecution, the applicant made a disclaimer limiting the claims to requiring a varying compositional ratio within the light emitting layer and disclaimed compositional differences between layers, e.g., a super lattice layer comprising first and second layers which are nitride semiconductors having a different composition respectively.	
17			
18			
19			
20			
21			
22			

The parties dispute (1) whether the claim phrase is definite, (2) how it should be construed, and (3) whether there was disclaimer during prosecution. The parties’ dispute as to disclaimer is the same as that discussed in Section III.C; thus, the Court’s conclusions there apply with equal force here. The Court thus turns to the remaining two disputes, addressing them in the same piecemeal fashion used by the parties in their briefing.

i. “spatial fluctuation . . . in the band gap”

Nitride proposes that “spatial fluctuation . . . in the band gap” should be construed as “continuous widening and narrowing of the band gap laterally within the second gallium nitride based semiconductor.” RayVio does not appear to disagree with this proposed construction. Responsive Br. 11. Accordingly, the Court adopts Nitride’s proposed construction of this phrase.

ii. “composition material”

RayVio argues that “composition material” should be limited to “material consisting of discrete area(s) of only a single element.” Responsive Br. 11-15. Nitride disagrees, and proposes no construction for this phrase. Opening Br. 17-19. Thus, the parties dispute turns on two discrete questions: (1) whether the “composition material” must be confined to discrete areas; and (2) whether the “composition material” must consist of a single element. The Court addresses each in turn.

As to discrete areas, the Court disagrees with RayVio that the “composition material” must be limited in its location to separate and distinct sub-parts. The claims require that the “composition material” is formed “on less than a total area” of the “first surface” of the “first gallium nitride based semiconductor.” ’270 patent, col. 5 ll. 34-36, col. 6 ll. 24-25. However, “less than a total area” does not mean discrete. On the contrary, the specification provides some indication that, at least in some embodiments, the “composition material” is sufficiently integrated with the “second gallium nitride based semiconductor” such that it is not separate and distinct. *See id.*, col. 3:44-51 (“Here, in the regions where Ga droplets are present, the solid phase composition of gallium *within* the undoped $\text{Al}_x\text{Ga}_{1-x}\text{N}$ layer 16 becomes high, and thus, a spatial fluctuation is formed in the band gap of the undoped $\text{Al}_x\text{Ga}_{1-x}\text{N}$ layer 16.”) (emphasis added). While is true that the specification also refers to the “composition material” as “discrete droplets” in preferred embodiments, *see, e.g., id.*, col. 1 ll. 51-53 (“forming of a composition material of the first gallium nitride based semiconductor a discrete area on the first gallium nitride based semiconductor”); *id.*, col. 2 ll. 10-11 (“discretely formed composition material”), *id.*, col. 3 ll. 39-40 (“form . . . discrete gallium droplets 14 having a diameter of approximately 10~500 nm”), this

does not compel a contrary result. These excerpts describe how the “composition material” is first formed on the “first surface” of the “first gallium nitride based semiconductor,” not how the “composition material” exists in the fully formed device. *See id.* And, in any event, these are merely descriptions of preferred embodiments. *See Liebel-Flarsheim v. Medrad, Inc.*, 358 F.3d 898, 913 (Fed. Cir. 2004) (“[I]t is improper to read limitations from a preferred embodiment described in the specification . . . into the claims absent a clear indication in the intrinsic record that the patentee intended the claims to be so limited.”). Accordingly, the Court declines to confine “composition material” to discrete areas.

As to single element, the Court disagrees that “composition material” should be so limited. Only dependent claims 2 and 9 require that “composition material” be limited to single elements (namely, Ga or Al). *See* ’270 patent, col. 5 ll. 45-48, col. 6 ll. 33-36. Independent claims 1 and 8 must be broader in scope, and, as such, could include “composition material” of multiple elements. Further, although the specification only discloses embodiments of “composition material” that are single elements, *see, e.g., id.*, col. 3 ll. 39-40 (“gallium droplets”); *id.*, col. 3 ll. 43-44 (“Ga droplets (or micro-blocks of gallium)”), *id.*, col. 4 ll. 1-7 (referring to “droplets” of Ga or Al), these are merely preferred embodiments. *See Liebel-Flarsheim*, 358 F.3d at 913. Nothing about the specification’s disclosure of the elements that can be “composition material” is so repeated or consistent that limiting “composition material” in this way is warranted. *Compare GPNE*, 830 F.3d at 1370 (limiting “node” to “pager” where “the specification repeatedly and exclusively uses [‘pager’ or ‘paging system’] to refer to the devices in the patented system”). Accordingly, the Court declines to limit “composition material” to a single element.

In sum, the Court finds that the “composition material” should neither be limited to discrete areas nor a single element. Accordingly, the Court adopts Nitride’s position and construes “composition material” to “material composed of some, but not all, of the elements of the first gallium nitride based semiconductor.”

iii. **“variation in the compositional ratio in the second gallium nitride based semiconductor” (claim 1) / “a second gallium nitride based semiconductor layer having a varied compositional ratio” (claim 8)**

a. **Indefiniteness**

RayVio contends that the phrases “variation in the compositional ratio” in claim 1 and “varied compositional ratio” in claim 8 are indefinite because they have no objective boundaries and the ’270 patent provides no basis as to how the “variation” or “ratio” can be measured. Responsive Br. 15-17. Nitride disagrees. Reply Br. 10-12.

Section 112 requires that “[t]he specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention.” 35 U.S.C. § 112(b). In *Nautilus*, the Supreme Court established the operative test: “a patent is invalid for indefiniteness if its claims, read in light of the specification delineating the patent, and the prosecution history, fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention.” 134 S. Ct. at 2128-29. The Federal Circuit has cautioned that “the dispositive question in an indefiniteness inquiry is whether the ‘claims,’ not particular claim terms” fail this test. *Cox*, 838 F.3d at 1231.

When claims involve terms of degree, the Federal Circuit has held that “[a]lthough absolute or mathematical precision is not required, it is not enough . . . to identify ‘some standard for measuring the scope of the phrase.’” *Interval Licensing LLC v. AOL, Inc.*, 766 F.3d 1370, 1371 (Fed. Cir. 2014). Instead, “[t]he claims, when read in light of the specification and the prosecution history, must provide objective boundaries for those of skill in the art.” *Id.* For example, in *Interval Licensing*, the Federal Circuit rejected claims as indefinite which required selectively displaying images “in an unobtrusive manner” because that phrase was “highly subjective” and “offer[ed] no objective indication of the manner in which content images are to be displayed to the user.” *Id.* at 1371. In contrast, in *Sonix Tech. Co. v. Publications Int’l, Ltd.*, the Federal Circuit found that claims requiring encoded information on an object to be “visually negligible” were not indefinite because this term “involve[d] what can be seen by the normal human eye,” which “provide[d] an objective baseline through which to interpret the claims.” 844

F.3d 1370, 1378 (Fed. Cir. 2017).

In light of this guidance, the Court agrees with Nitride that the disputed phrases do not render the claims indefinite. The claims do not require a particular degree of “variation in the compositional ratio.” Instead, they just require that variation exists. This is a binary question whose answer can be determined objectively: does the compositional ratio of the atoms in the second gallium nitride based semiconductor vary?

RayVio’s attempts to cast doubts on definiteness are not persuasive. First, RayVio contends that “neither the claims nor the specification state what two specific quantities are being compared.” Responsive Br. 15-16. This is not true: the specification makes clear that the comparison should be made between “the region where the composition material is present” and “the region where the composition material is not present.” ’270 patent, col. 1 ll. 62-65. Second and third, RayVio argues that the ’270 patent fails to clarify a basis for how the “variation” or “ratio” can be measured, leaving a person of ordinary skill in the art to guess between multiple approaches. Responsive Br. 16-17. These are strawmen. As discussed above, the claims do not require a particular level of variation; thus, choices as to measurement are not a source of indefiniteness. Moreover, the specification provides an example of how variation can be identified within a preferred embodiment: in the context of AlGa_N, the existence of Ga droplets creates the claimed variation in compositional ratio. *See* ’270 patent col. 3 ll. 44-47 (“in the regions where Ga droplets are present, the solid phase composition of gallium within the undoped Al_xGa_{1-x}N layer 16 becomes high”); Abstract (“the compositional ratio of Ga and Al in the undoped AlGa_N layer varies due to the presents of the droplets”).

Accordingly, the Court agrees with Nitride that the phrases “variation in the compositional ratio” in claim 1 and “varied compositional ratio” in claim 8 do not render those claims indefinite. Because these are the only sources of indefinite for which Nitride complains, its indefiniteness challenge fails.

b. Claim Construction

RayVio proposes in the alternative that the phrases “variation in the compositional ratio” in

claim 1 and “varied compositional ratio” in claim 8 be construed to mean “variation in the ratio of (1) the amount of composition material to (2) the amount of gallium nitride based material.” Responsive Br. 17-18. Nitride counters that this clarification is unwarranted and instead proposes “changes in the ratio of the elements in the second gallium nitride based semiconductor created by the composition material.” Reply Br. 12-13.

The parties essentially disagree about the locus of variation: for RayVio, relative *amounts* of composition material and gallium nitride based semiconductor vary; for Nitride, the relative distribution of elements within the gallium nitride based semiconductor vary. On this point, the Court agrees with Nitride. Reading the claims in light of the specification makes clear that “variation in the compositional ratio” refers to variation in the distribution of elements within the “second gallium nitride based semiconductor.” For example, in the preferred embodiment described in the specification, the “composition material” is droplets of Ga, and the “second gallium nitride based semiconductor” is the undoped AlGa_N layer. The specification explains that

in the regions where Ga droplets are present, the solid phase composition of gallium within the undoped AlGa_N layer 16 becomes high, and thus, a spatial fluctuation is formed in the band gap of the undoped AlGa_N layer 16. In FIG. 1B, this phenomenon of *compositional variation within the undoped AlGa_N layer 16 due to the gallium droplets 14* is schematically shown by different hatchings.

’270 patent, col. 3 ll. 44-51 (emphasis added). The Abstract describes a similar process:

When the undoped AlGa_N layer is formed, droplets of Ga or Al are formed on the n type AlGa_N layer. The *compositional ratio of Ga and Al in the undoped AlGa_N layer varies due to the presence of the droplets*, creating a spatial fluctuation in the band gap.

Id., Abstract (emphasis added). Thus, “variation in the compositional ratio” refers to variation in the relative distribution of elements (e.g., Ga or Al within AlGa_N). Nitride’s proposed construction correctly reflects this point.

In sum, the Court adopts Nitride’s position and construes the phrases “variation in the compositional ratio” (in claim 1) and “varied compositional ratio” (in claim 8) to refer to “changes in the ratio of the elements in the second gallium nitride based semiconductor created by the composition

material.”

iv. Conclusion

Piecing the above conclusions together, the Court construes “a spatial fluctuation is created in the band gap by variation in the compositional ratio in the second gallium nitride based semiconductor created by the composition material” to mean “continuous widening and narrowing of the band gap laterally within the second gallium nitride based semiconductor is created by changes in the ratio of the elements in the second gallium nitride based semiconductor created by the composition material.” “Composition material” is construed to mean “material composed of some, but not all, of the elements of the first gallium nitride based semiconductor.”

E. “the first gallium nitride based semiconductor” / “the second gallium nitride based semiconductor” (claim 9)

Agreed-Upon Construction

The term “the first gallium nitride based semiconductor” means “the first gallium nitride based semiconductor layer.” The term “the second gallium nitride based semiconductor” means “the second gallium nitride based semiconductor layer.”

Two days before the hearing, the parties reached an agreement that the terms “the first gallium nitride based semiconductor” and “the second gallium nitride based semiconductor” in claim 9 of the ‘270 patent (for this claim only) should be construed as “the first gallium nitride based semiconductor layer” and “the second gallium nitride based semiconductor layer,” respectively. The Court adopts this agreed-upon construction.

F. “a base layer” (claims 5, 12)

Nitride’s Proposed Construction	RayVio’s Proposed Construction	Court’s Construction
“a thickness of material, which may be made up of sub-layers, that serves as a base for forming other layers above it”	This limitation is indefinite rendering claims 5 and 12 invalid. Alternative construction if claim is not indefinite: “a discrete layer for varying diffusion length of the composition materials of a gallium nitride based semiconductor”	“a thickness of material, which may be made up of sub-layers, that serves as a base for forming other layers above it”

The parties dispute whether the term “a base layer” renders claims 5 and 12 indefinite.

According to RayVio, this phrase is indefinite because there is no guidance in the '270 patent as to what materials or properties a "base layer" must have. Responsive Br. 20-21. Nitride disagrees, arguing that the several exemplary embodiments in the specification are sufficiently clear in delineating the scope of "base layer." Reply Br. 13-14.

The Court agrees with Nitride. "[B]readth is not indefiniteness." *SmithKline Beecham Corp. v. Apotex Corp.*, 403 F.3d 1331, 1341 (Fed. Cir. 2005). Although the claims, read in light of the specification, do not provide a lot of detail about the "base layer," they provide enough to "inform, with reasonable certainty, those skilled in the art about the scope of the invention." *Nautilus*, 134 S. Ct. at 2128-29. Specifically, the claim language states that the "base layer" is used in obtaining "lattice mismatch," and a "light emitting" "gallium nitride based semiconductor" is formed above it, where "spatial fluctuation" is created "in the band gap" by the "lattice mismatch." This provides some objective boundaries for "base layer;" for example, materials and thicknesses that do not produce fluctuation or allow light emission would not qualify. The specification provides further clarity. In the embodiment depicted in Figure 3, "lattice mismatch layer 21" is formed on a base² "AlGaN layer 20." '270 patent, Fig. 3, col. 4 ll. 55-59. The specification also discloses that, alternatively, "lattice mismatch layer 21" can be formed on base "GaN layer 22." *Id.*, col. 5 ll. 18-21. These exemplary embodiments add sufficient contour to "base layer" such that a person of ordinary skill in the art would know, with sufficient clarity, what a "base layer" should be.

RayVio's arguments to the contrary are not persuasive. RayVio proposes that, in order to know the scope of the claims, a person of ordinary skill in the art would need to know at least the

² RayVio complains that the phrases "base 'AlGaN layer 20'" and "base 'GaN layer 22'"—first used by Nitride in its briefing—are misleading. Dkt. No. 89. According to RayVio, the specification never uses the phrase "base layer," much less with reference to these layers in Figure 3. While this is true, the Federal Circuit has made clear that "when examining the written description for support for the claimed invention, . . . the exact terms appearing in the claim 'need not be used in *haec verba*,'" *Blue Calypso, LLC v. Groupon, Inc.*, 815 F.3d 1331, 1345 (Fed. Cir. 2016) (quoting *Lockwood v. Am. Airlines, Inc.*, 107 F.3d 1536, 1572 (Fed. Cir. 1997)). Here, reading the claims in the context of the specification makes clear that these are exemplary embodiments of "base layer."

chemical formula, doping, and thickness of the base layer. Dkt. No. 89 at 3. This is too specific. As Nitride persuasively points out, Dkt. No. 92 at 2, there is no dispute that a person of ordinary skill in the art can understand the scope of the claim term “substrate,” even though its properties such as composition and thickness are not recited. Moreover, even if this additional detail would be helpful, the specification gives both the thickness (“1~100 nm”) and composition (“AlGaN” or “GaN”) of the exemplary “base layer” in Figure 3. ’270 patent, 4:45-5:21. A person of ordinary skill in the art could read this disclosure and know, with reasonable certainty, the range of base layers that the claims cover. Accordingly, reading the claims in light of the specification, “base layer” does not render claims 5 and 12 indefinite.

The question then becomes how the Court should construe this phrase. According to Nitride, “a base layer” should be construed to mean “a thickness of material, which may be made up of sub-layers, that serves as a base for forming other layers above it.” Opening Br. 22-23. According to RayVio, “a base layer” should be construed to mean “a discrete layer for varying diffusion length of the composition materials of a gallium nitride based semiconductor.” Responsive Br. 21. The Court agrees with Nitride. The ’270 patent discloses two different embodiments of “a base layer:” (1) “a base layer created by forming a discrete layer for varying diffusion length,” ’270 patent, col. 2 ll. 12-19; and (2) “a base layer having a lattice mismatch,” *id.*, col. 2 ll. 33-37. The first corresponds to independent claims 3 and 10, while the second corresponds to independent claims 5 and 12. Thus, RayVio’s proposed construction draws from an unrelated embodiment and cannot properly be used to determine the meaning of the “base layer” in claims 5 and 12. Accordingly, the Court adopts Nitride’s position.

“A base layer” is construed to mean “a thickness of material, which may be made up of sub-layers, that serves as a base for forming other layers above it.”

G. “lattice mismatch layer” (claim 5)

Nitride’s Proposed Construction	RayVio’s Proposed Construction	Court’s Construction
“a thickness of material, which may be made up of sub-layers, that has a different atomic	This limitation is indefinite rendering claim 5 invalid. Alternative construction if	“a thickness of material, which may be made up of sub-layers, that has a different atomic

spacing”	claim is not indefinite: “a discrete layer that has a relatively high lattice mismatch with, and is composed of a different type of material than, the base layer and the gallium nitride based semiconductor”	spacing and is composed of a different type of material than the base layer and the gallium nitride based semiconductor”
----------	--	--

The parties dispute whether the claim term “lattice mismatch layer” is definite and how it should be construed. RayVio’s sole indefiniteness argument appears to be based on its own construction of this term—namely, that there is no objective guidance for what constitutes a “relatively high lattice mismatch.” Thus, the Court first addresses the parties’ dispute regarding construction and then turns to indefiniteness.

On claim construction, the Court notes that the parties appear to agree that the “lattice mismatch layer” must be composed of a different material than the layers it touches—namely, the “base layer” (such as the AlGa_N 20 layer in Figure 3) and the “gallium nitride based semiconductor” (such as the Ga_N 22 layer in Figure 3). *Compare* Responsive Br. 21-22, *with* Reply Br. 14. Thus, the parties only dispute whether the “lattice mismatch layer” is a “a thickness of material, which may be made up of sub-layers, that has a different atomic spacing” (as Nitride proposes) or “a discrete layer that has a relatively high lattice mismatch with . . . the base layer and the gallium nitride based semiconductor” (as RayVio proposes).

RayVio argues that its proposed construction is correct because the ’270 patent explicitly defined “lattice mismatch layer” in this way in the specification. As support, RayVio cites the following:

When forming the Ga_N layer 22 on the AlGa_N layer 20, a discrete layer (lattice mismatch layer) 21 of a material having relatively high lattice mismatch, more specifically, AlN, InN, AlInGa_N, Si, MgN, or the like is formed, and the Ga_N layer 22 is formed on the AlGa_N layer 20 onto which this layer 21 is formed.

’270 patent, col. 4 ll. 55-59. The Court disagrees that this is an instance of inventor lexicography. When read in context, this excerpt is only describing a specific preferred embodiment. The parenthetical “lattice mismatch layer” is used to identify the “lattice mismatch layer” in that embodiment; this does not, however, mean that all “lattice mismatch layer” must be confined to

that description. Accordingly, the Court will not construe “lattice mismatch layer” to be restricted to this meaning.

Having rejected RayVio’s narrower proposal, the Court is left with Nitride’s proposed construction: “a thickness of material, which may be made up of sub-layers, that has a different atomic spacing.” However, because, as discussed above, the “lattice mismatch layer” must be composed of a different material than the layers it touches, the Court will modify Nitride’s proposal to make this clear. Accordingly, the Court construes “lattice mismatch layer” to mean “a thickness of material, which may be made up of sub-layers, that has a different atomic spacing and is composed of a different type of material than the base layer and the gallium nitride based semiconductor.”

Because RayVio’s indefiniteness argument rests solely on a proposed construction which the Court has rejected, its indefiniteness arguments fail. Accordingly, the Court agrees with Nitride that “lattice mismatch layer” does not render claim 5 indefinite.

H. “the lattice mismatch” (claim 5) / “a lattice mismatch” (claim 12)

Nitride’s Proposed Construction	RayVio’s Proposed Construction	Court’s Construction
“the difference in atomic spacing” / “a difference in atomic spacing”	This limitation is indefinite rendering claims 5 and 12 invalid. Alternative construction if claim is not indefinite: The term “the lattice mismatch” in claim 5 means “the lattice mismatch resulting from the lattice mismatch layer.” The term “a lattice mismatch” in claim 12 means “a lattice mismatch layer,” which is construed above as “a discrete layer that has a relatively high lattice mismatch with, and is composed of a different type of material than, the base layer and the gallium nitride based semiconductor [layer].”	The term “the lattice mismatch” in claim 5 means “the lattice mismatch resulting from the lattice mismatch layer.” The term “a lattice mismatch” in claim 12 means “a lattice mismatch layer.” For both claims 5 and 12, “a lattice mismatch layer” means “a thickness of material, which may be made up of sub-layers, that has a different atomic spacing and is composed of a different type of material than the base layer and the gallium nitride based semiconductor.”

The parties dispute whether the claim terms “[a/the] lattice mismatch” are definite and how they should be construed.

Turning first to indefiniteness, RayVio contends that the phrase “[a/the] lattice mismatch” render the claims indefinite because the claims are ambiguous as to what the “lattice mismatch” is between—it could be between the “lattice mismatch layer” and the “base layer,” the “lattice mismatch layer” and the “gallium nitride based semiconductor,” or the “lattice mismatch layer” and both the “base layer” and “gallium nitride based semiconductor.” Responsive Br. 24-25. RayVio also contends that “the lattice mismatch” in claim 5 is indefinite because it lacks antecedent basis. *Id.* at 24.

Taking these arguments in reverse order, the Court finds that, although RayVio is correct that “the lattice mismatch” in claim 5 lacks an antecedent basis, this does not render the claim indefinite. *See Energizer Holdings*, 435 F.3d at 1370-71 (“[D]espite the absence of explicit antecedent basis, ‘[i]f the scope of a claim would be reasonably ascertainable by those skilled in the art, then the claim is not indefinite.’” (quoting *Bose*, 274 F.3d at 1359)). Reading the entirety of claim 5, it would be clear to a person of ordinary skill in the art that “the lattice mismatch” refers to a lattice mismatch resulting from the “lattice mismatch layer” recited in step (a). As such, its lack of antecedent basis does not render claim 5 indefinite.

Turning to RayVio’s first argument, the Court also finds that claims 5 and 12 are not indefinite on this basis. As discussed above, “a patent is invalid for indefiniteness if its claims, read in light of the specification delineating the patent, and the prosecution history, fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention.” *Nautilus*, 134 S. Ct. at 2128-29. The term “lattice mismatch” is has a well-understood meaning in the art. *See Bretschneider Decl.* ¶¶ 159-160, 164; Ponce Dep., 137:15-22. Further, the ’270 patent describes an embodiment of claims 5 and 12 in detail, including identifying specific exemplary materials that could be used to form each layer. *See* ’270 patent, col. 4 l. 50-col. 5 l. 6 (describing a “base layer” comprised of AlGa_N, a “gallium nitride based semiconductor” comprised of Ga_N, and a “lattice mismatch layer comprised of Al_N, In_N, AlInGa_N, Si, Mg_N, or the like”). Although, based on this description, it seems possible that the “lattice mismatch” could occur between any of the three layers, this, ultimately, would not prevent a person of ordinary skill in the art from understanding the scope of the claims with reasonable certainty. This may sweep in a broad range

of potentially infringing devices, but the boundary is nonetheless clear.

Having rejected RayVio’s indefiniteness arguments, the Court turns to claim construction. Logically reading the plain language of the claims, the Court agrees with RayVio that the term “the lattice mismatch” in claim 5 means “the lattice mismatch resulting from the lattice mismatch layer.” The Court also agrees with RayVio that the term “a lattice mismatch” in claim 12 means “a lattice mismatch layer.” The Court previously construed “lattice mismatch layer” in Section III.H. It will thus apply this same construction to this term in claims 5 and 12: the “lattice mismatch layer” means “a thickness of material, which may be made up of sub-layers, that has a different atomic spacing and is composed of a different type of material than the base layer and the gallium nitride based semiconductor.”

IV. ORDER

For the reasons set forth above, the Court Construes the disputed terms as follows:

Claim Terms	Court’s Construction
The Order of Steps in Method Claims 1 and 5	Method claim 1 requires performance of the steps in the sequence recited in the claim, namely step (a) is performed, and then step (b) is performed, and then step (c) is performed. Method claim 5 requires performance of the steps in the sequence recited in the claim, namely step (a) is performed, and then step (b) is performed.
“forming on” / “formed on” (claims 1, 5, 8, 12)	“form(ing/ed) in contact with and above”
“a light emitting layer” (claims 1, 5, 8, 12)	“a thickness of material having a varied compositional ratio, which may be made up of sub-layers, that generates light” During prosecution, the applicant made a disclaimer limiting “light emitting layer” to having a varying compositional ratio within the light emitting layer.
“a spatial fluctuation is created in the band gap by variation in the compositional ratio in the second gallium nitride based semiconductor created by the composition material” (claim 1)	“continuous widening and narrowing of the band gap laterally within the second gallium nitride based semiconductor is created by changes in the ratio of the elements in the second gallium nitride based semiconductor created by the composition material” “Composition material is construed to mean “material composed of some, but not all, of the elements of the first gallium nitride based semiconductor.” During prosecution, the applicant made a disclaimer limiting “light emitting layer” to having a varying compositional ratio within the

	light emitting layer.
“the first gallium nitride based semiconductor” / “the second gallium nitride based semiconductor” (claim 9)	The term “the first gallium nitride based semiconductor” means “the first gallium nitride based semiconductor layer.” The term “the second gallium nitride based semiconductor” means “the second gallium nitride based semiconductor layer.”
“a base layer” (claims 5, 12)	“a thickness of material, which may be made up of sub-layers, that serves as a base for forming other layers above it”
“lattice mismatch layer” (claim 5)	“a thickness of material, which may be made up of sub-layers, that has a different atomic spacing and is composed of a different type of material than the base layer and the gallium nitride based semiconductor”
“the lattice mismatch” (claim 5) / “a lattice mismatch” (claim 12)	The term “the lattice mismatch” in claim 5 means “the lattice mismatch resulting from the lattice mismatch layer.” The term “a lattice mismatch” in claim 12 means “a lattice mismatch layer.” For both claims 5 and 12, “a lattice mismatch layer” means “a thickness of material, which may be made up of sub-layers, that has a different atomic spacing and is composed of a different type of material than the base layer and the gallium nitride based semiconductor.”

IT IS SO ORDERED.

Dated: May 11, 2018



EDWARD J. DAVILA
United States District Judge